



UNIVERSITÀ
degli STUDI
di CATANIA

DIPARTIMENTO DI FISICA E ASTRONOMIA
Ettore MAJORANA

DOTTORATO DI RICERCA IN FISICA

ANNO ACCADEMICO 2018 - 2019

Cosmic Rays Physics Laboratory

3 CFU

Teaching staff

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Reception hours: all days, on request by e-mail

Program of the course:

- 1) *Basic properties of the secondary cosmic ray radiation at the sea level. Composition of the secondary radiation, momentum spectrum and angular distribution of cosmic muons. Cosmic ray flux at sea level and moderate altitudes.*
- 2) *Experimental techniques for the detection of secondary cosmic rays. Geiger counters, scintillation detectors with PMT and SiPM devices, Multigap Resistive Plate Chambers. Acceptance and efficiency calculations by Monte Carlo methods. Evaluation of detection efficiency with scintillation detectors.*
- 3) *Statistics of counting from basic cosmic ray experiments. Experimental session with Geiger counters and application of the Poisson distribution. Analysis session on the time distribution between close events.*
- 4) *Coincidence experiments with detectors arranged in a telescope configuration. Data analysis from coincidence experiments with cosmic muons.*
- 5) *Detection of extensive air showers from coincidence measurements between far detectors. GPS tagging of events from far detectors.*
- 6) *Data analysis from MRPC telescopes. Evaluation of track data quality. Analysis of angular distribution of cosmic muons.*

Depending on the number of interested students and their previous background, specific experimental and analysis sessions will be organized during the course.

Bibliography:

A proper bibliography will be given during the lectures and experimental sessions.